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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/470,343	12/22/1999	Bernardo Martinez-Tovar	P-1583	6032
23413	7590	10/06/2005	EXAMINER CHAMBERS, TROY	
CANTOR COLBURN, LLP 55 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002			ART UNIT 3641	PAPER NUMBER

DATE MAILED: 10/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 09/470,343	Applicant(s) MARTINEZ-TOVAR ET AL.	
	Examiner Troy Chambers	Art Unit 3641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 21 September 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-4, 6-9, 11, 15, 16, 18 and 35-40 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6-9, 11, 15, 16, 18 and 35-40 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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## DETAILED ACTION

### *Specification*

1. The disclosure is objected to because of the following informalities: Applicant's specification makes several references to °K. However, there is not such thing °K since the K or Kelvin stands alone and is not measured in degrees.

Appropriate correction is required.

### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-4, 6-9, 11, 15, 16, 35, 37 and 38 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Specifically, claim 1 recites, "the bridge section being free of a *layer* of tungsten". However, there is nothing in the specification that excludes tungsten in any particular form such as layer form or as part of an alloy with titanium.
4. Claim 38 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one

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skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Specifically, claim 38 recites, "a bridge section is free of a layer of metal having a melting temperature that is higher than the vaporization temperature of the semiconductor material". However, there is nothing in the specification that excludes tungsten in any particular form such as layer form or as part of an alloy with titanium.

5. Claim 38 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. It would appear that silicon has a vaporization temperature higher than that disclosed by the applicant's specification (see discussion below with respect to MT). In view of this, claim 38 is new matter since there would be included metals which have a melting temperature higher than 2628 K and less than 4423 K.

### ***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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7. Claims 18, 35, 36, 37, 38, 39 and 40 are rejected under 35 U.S.C. 102(b) as being anticipated by PCT Publication WO 9742462 issued to Martinez-Tovar ("MT"). MT discloses a semiconductor bridge device 10, comprising: a silicon or sapphire substrate 112; an electrical bridge structure disposed on the substrate 12 (fig. 8), the bridge structure comprising a layer of semiconductor material; a base layer of titanium 118 free of tungsten on the bridge section and *disposed on the semiconductor material*; the bridge structure comprising a bridge section 114c extending between pad sections 14a/b; a pair of aluminum lands 116a/b; a pair of electrical leads 50 a/b; and, a capacitor connected to said leads 50 a/b (pg. 24, ll. 24-29). MT discloses a substrate comprises silicon with a silicon dioxide layer (pg. 8, ll. 16-21). MT discloses a substrate comprising sapphire (pg. 8, ll. 24-27). MT discloses a semiconductor bridge wherein the material having a negative coefficient of electrical conductivity comprises polycrystalline silicon (claim 18). The Examiner equates "consisting essentially of" with "comprising".

8. Applicant has used the transitional phrase "consisting essentially of" in claim 18 to exclude those elements that materially affect the basic and novel characteristics of the claimed invention. The applicant's specification claims that the efficiency of the device is compromised because the melting point of tungsten (3695 K) is higher than the vaporization temperature of silicon (2628 K). While no special meaning will be given to the transitional phrase "consisting essentially of", the Examiner has found several documents that suggest the presence of tungsten in semiconductor bridge igniter would not materially affect the features of the device as alleged by the applicant. For example,

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documents including Inventor of the Week, suggest that silicon vaporizes at a temperature much higher than that claimed by the applicant (4150 degrees C).

Moreover, US 2003/0192445 (Baginski) (not used as prior art but to merely show what is known about plasma events in igniters) in its discussing the prior art discloses that plasma events exceed temperatures in excess of 4000 K ([0006]). In view of this, it would appear that the tungsten would have melted long before the semiconductor material vaporized, thus eliminating any barrier between the energetic material charge and the plasma.

9. With respect to claim 36, MT discloses a base layer of titanium.

***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 1-4, 6-9, 11, 15, 16, 18 and 35-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Benson in view of DE4222223 issued to Dipling.

12. With respect to claims 1, 18, 36, 39 and 40 Benson discloses a semiconductor bridge igniter comprising: a substrate 12, 18; a tungsten clad bridge structure 16 as shown in Fig. 1; and, a pair of lands 14. Benson discloses vaporizing the tungsten and silicon layer. Benson does not disclose a bridge structure comprising titanium and excluding tungsten as claimed by the applicant. However, igniters with only titanium as the bridge metal is well known in the art as it is disclosed by Dipling (and others).

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Dipling discloses an electrical igniter having an insulating layer 114 and a bridge 132 connecting two pads 128, 130. The entire bridge/pad assembly can be made of titanium or the bridge structure alone can be made of titanium while the pads can be made of a metal with a lower specific resistance (abstract). At the time of the invention, one having ordinary skill in the art would have found it obvious to apply the teachings of Dipling of the benefits of using a pure titanium bridge to the semiconductor device of Benson. The suggestion/motivation for doing so would have been to provide for improved mechanical characteristics as well as reduction in sensitivity to scratches and chaffs. Also, as the machine translation points out, there is a very good adjustment of the thermal coupling between the priming charge and ignition bridge.

13. With respect to claim 2, Benson discloses electrical leads 22.
14. With respect to claim 3, Benson discloses a source of electrical energy 24.
15. With respect to claim 4, the Examiner takes Official Notice that the use of capacitors as the source of energy for igniters is well known in the art.
16. With respect to claims 6-8 and 35, Benson discloses a silicon dioxide layer 18.
17. With respect to claim 9, Benson discloses undoped silicon (col. 3, line 67 to col. 4, ll. 1).
18. With respect to claim 11, Dipling discloses an igniter disposed in contact with an energetic material 120 and contained within a header 114.
19. With respect to claim 15, Fig. 2 shows lands 14 disposed on the layer of metal 17.
20. With respect to claim 16, Benson discloses aluminum lands 14 (col. 4, ll. 46-48).

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21. Claim 37 (which depends from apparatus claim 36) recites a desired result (a lower energy requirement) and is therefore not given patentable weight.

22. With respect to claim 38, Benson and Dipling disclose a combined device including a titanium clad semiconductor bridge.

### ***Response to Arguments***

23. Applicant's arguments filed 09/21/05 have been fully considered but they are not persuasive.

24. Applicant objects to the Examiner's interpretation of "consisting essentially of" as being equivalent to comprising. The Examiner maintains this position for the reason that such terminology is a term of art that has special meaning in the chemical arts and process claims. As the Examiner pointed out to the applicant in a previous claim, the use of "consisting essentially of" has no effect on the claimed apparatus because, regardless of what combination of metals are used, the device will be the same---merely a collection of semiconductor and metal parts that can serve as a igniter for an airbag or a high-tech paperweight. It is only when a charge is applied to the device and a plasma event takes place that such combination of metals may be relevant. Applicant cited AK Steel as support for the arguments. However, it is clear that the apparatus involved AK Steel is chemical in nature. In AK Steel, the claimed device was affected by the amount of silicon in the mixture. A steel strip coated with aluminum and 8% silicon has properties different than one coated with aluminum and 0.5% aluminum---just as coffee with a teaspoon of sugar is chemically different than one with a tablespoon of sugar. In



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the applicant's device, mixing titanium with any other metal has no effect until the device is in use.

25. Applicant's arguments with respect to claims 1-3, 6-8, 11, 13-15, 18 and 35 as being rejected under 35 USC 103 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

26. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art cited on form PTO-892 are cited as of interest to show similar devices.

27. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Troy Chambers whose telephone number is (571) 272-6874 between the hours of 7:00 a.m. to 3:30 p.m., M-F. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael J. Carone, can be reached at (571) 272-6873.

Troy Chambers, Examiner

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A handwritten signature in black ink, appearing to read 'T. Chambers', is written over the printed name of the examiner.